

An Effective Computer Based Examination System for University

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Abstract: *Computer Based Examination System (CES) is an efficient and time saving mode of conducting examinations to a larger number of students at the same time. It is an effective solution to evaluate huge number of students. In recent times many computer based examination systems have been developed in which lack of flexibility remains a major drawback. Timing functionalities like automatically logging-off candidates upon expiration of allotted time, random generation of questions and accommodation of large number of students at the same time are the advantages of our proposed system. In this paper, a computer based examination system is developed which combines many of the advantages as one. The Data Flow Diagram (DFD) of the system is presented. The programming tools used for the front-end development of the system are Java Servlet Pages (JSP) and Net Beans IDE 7.2 integrated development environment while MySQL is used as the database back end.*

Keywords: Computer Based Examination System (CES), Data Flow Diagram, Admin Module, Student Module

1. Introduction

The manual writing method of examination looks unappealing due to many reasons. The problems included are malpractices during examination, delay in result generation, wastage of printed resources and errors occurred due to human negligence. Thus the need for developing a flexible examination model which is devoid of the above mentioned drawbacks arises. In the recent years, there have been many computer based examination systems with one or more limitations. Some of which are not being able to automatically log-off candidates upon expiration of allotted time and lack of randomization of questions for each candidate. The CES systems are deployed as stand-alone applications on MySQL and JSP tools. It runs on distributed a network which makes it easily accessible within the range of LAN connectivity. This feature alone makes the CES model an easy to use system for even smaller institutions. The advantages of the CES system make it a single sufficient model even to accommodate large masses of students.

2. Related Works

There already exist numerous such systems, which were designed to suit a particular university with predefined strength of students. The following are the computer based examination systems that are already in use. A computer-based test (CBT) system for university academic enterprise examination done by Fagbola Temitayo M., et al., (2013) proposes that flexible

online learning mediated by ICT becomes more pervasive, and since there is a growing need for educators to consider modes of assessment using similar tools. Computer Based Test (CBT) is an effective solution for mass education evaluation [4]. Another research was “An architectural insight into the national online examination system” done by P Govind Raj, et al., (2012), their proposed Online examination system has been developed as per the requirements of NASSCOM and DIT. A paper that emphasized on security measures required for the online

examination systems was “A novel approach to enhance security for online exams” proposed by Naresh Chiranj, et al., Online exams have not been widely adopted well, but online education is adopted and using all over the world without any security issues. So, to enhance security in online exam management environment, cryptography techniques using remote monitoring and control of ports and input were used in their work [8].

3. Computer based examination system (CES)

The development of the Computer Based Examination System (CES) working module is initiated by designing the E-R diagram, Data Flow diagram and the class diagram for the working of the system. The complete components of the CES have three divisions: they are the Admin module, the staff module and the student module. All the three modules are described here. The process starts from the point where an account is created for every staff and student with username and password. The admin manages this process. The staffs logs in to their account to add questions to the question bank. The student can attend the exam on appropriate login and the marks appear immediately after submitting the test. Flagging option is an additional effective way to secure the course of the exam, where once a question is attended the student will not be able to change the option. The three modules of the CES system are

- Admin module
- Staff module
- Student module

3.1 Admin Module

The functionalities of the admin are adding details of new students, staff and or deleting or modifying the same. The additional responsibilities of the admin are providing appropriate login details for the registered users of the portal.

3.2 Staff Module

The staff module describes the complete functions and responsibilities of the staff. The main action for the staff to perform is to add appropriate subject wise questions to the question bank or the database with the correct options marked. The questions added to the database can be viewed subject wise on the whole. This module has an additional benefit that is to view class wise and subject wise results of the students. The advantage given by CES to staffs is that there is no need to evaluate answer papers of each and every student.

3.3. Student Module

The functionalities of the student are limited to just attending tests. The CES system is aimed in making the test process as simple as possible and the direct beneficiaries of this system are the students as it reduces the fatigue present in the paper and pen based test processes. The student module of the CES works as the portal for students of the University. All students registered by the admin can access their portal by providing their username and the password. On right match of the username and the password they can enter their page where options like Attend test, view marks are given. An additional option to modify their personal details is also given.

3.4 Data flow diagram (DFD) of CES

The admin module, staff and student modules render their part of functions to the CES. The initialization of the CES is done by the ADMIN, who gives appropriate account credentials to the users, in this case the students and the staff. The admin adds registered details of the users to the CES database and can modify later if required. The STAFF adds questions to the question bank of the CES in subject wise manner. The question numbers are consecutively generated. The complete class wise or subject wise results of students can be viewed by the staff or admin at any time after the test completion. The student only has to login to attend the test and on the point of completion and submission the result is immediately generated.

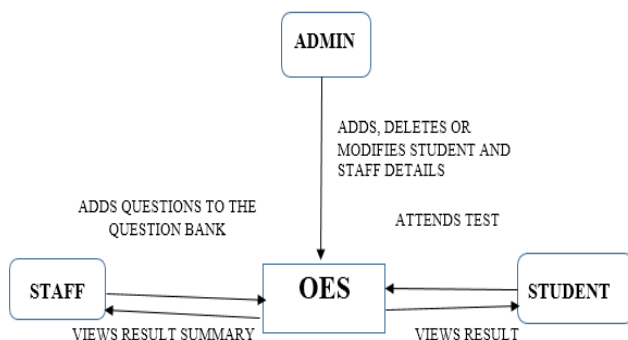


Figure 1: Data Flow Diagram (DFD) of CES

3.5 Programming tools used

The programming tools used for the front-end development of the system are Java Servlet Pages (JSP) and Net Beans IDE 7.2 integrated development environment while MySQL is used as the database backend

4. Experimental Results

The CES system consists of 4 main pages including the home page, student login page, staff login page and the admin login page. These pages have links to other subpages like the question bank, result summary, page for attending test.

4.1. The Home Page

The home page is the initial view of the CES. It has separate login selection icons for admin, student and staff. Selecting any one of the icon leads to the respective login pages.



Figure 2: The Home page

4.2. Login page

The home page icon selection leads to the respective login pages which can be for student, admin or staff. The result of providing correct username and password in the login page takes the users to their own accounts.



Figure 3: General Login page

4.3 Staff account

The successful login in the staff login page takes the user to a personal account page. The provisions included for the staff are to add questions into the question bank, to view previously added questions and to acquire results of students either subject wise or class wise.



Figure 4: Staff account page

4.4 Question bank

The question bank page is where the staff adds questions. The fields needed to be filled are the subject to which the questions pertain, the questions and the options for the questions. The right option is selected through the radio button selection and it gets marked in the database on successful submission.

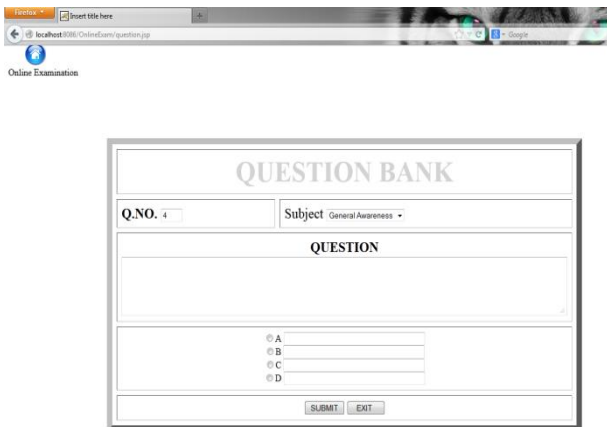


Figure 5: Question bank page

4.5 Student account

The student is taken to a page called the student account page on successful login. The student can take tests and also have an additional function to modify the personal details of their own. Signing off from their account on any of the above cases takes the user to the main home page.

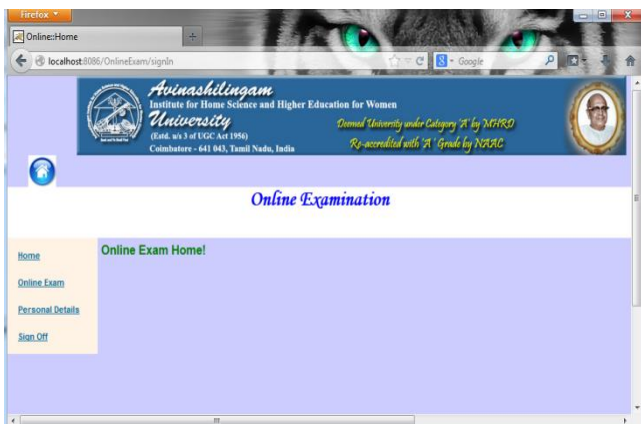


Figure 6: Student account page

4.6 Test page

The student on selecting the option to take tests is taken to the test page. Once the test is started the timer starts running. The timer in this case is set to 60 minutes. An additional attribute attached to this module is the flagging option. The flagging option makes sure that the answers once selected cannot be changed and the same question cannot be answered again.

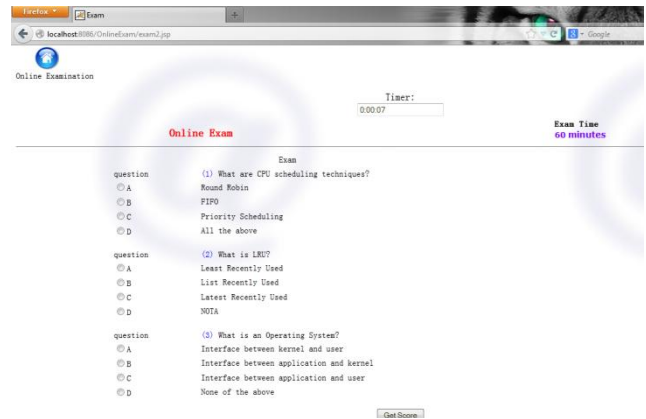


Figure 7: Page for attending tests

5. Conclusion

On the whole the CES is an essential tool for every university, so as to be in par with the growing need for making everything instant and quick. By deploying efficient CES, resources like time, energy to evaluate every single answer sheet and the need to use paper is reduced. As of now most of the competitive examinations are online, so the need to train students to get used to an online testing environment is essential and CES is an excellent platform for this.

6. Future Work

The future work of this paper is to add additional security functionalities like finger print recognition or face recognition to the login module. In addition to it, apart from just testing the students on an objective basis, the theoretical knowledge can also be tested with adding brief answers to the test portal. With the addition of these functionalities the CES becomes an effective online portal for conducting mass examinations.

References

- [1] B. Ipaye (2009), "E-Learning in a Nigerian Open University", National Open University of Nigeria, page 1-11.
- [2] C.K. Ayo, I.O. Akinyemi, A.A. Adebisi and U.O. Ekong (2007), "The Prospects of E-Examination Implementation in Nigeria", Department of Computer and Information Sciences, Covenant University, Ota, NIGERIA. Turkish Online Journal of Distance Education - TOJDE. ISSN 1302-6488 Volume: 8 Number: 4 Article
- [3] F. Andrew, Darren Pullen and Colleen Harper (2009). "Case study of a computer based examination system"

- Australian Journal of Educational Technology, 25(4), 509- 523.10, page 125-135.
- [4] Fagbola Temitayo M., Adigun Adebisi A., Oke Alice O(2013),” Computer-Based Test (Cbt) System for University Academic Enterprise Examination”, International Journal of Scientific & Technology Research Volume 2, Issue 8, August 2013.
- [5] I.M.M. Emary El and J.A.A. Abu (2006), “An Online Website for Tutoring and E-Examination of Economic Course”, American Journal of Applied Sciences 3 (2): Page 1715-1718, ISSN 1546-9239.
- [6] O.A. Agbaji, O.T.Ruth and M.B. Soroyewun (2010), “Development of an E-Assessment Platform for Nigerian Universities”, Research Journal Applied Sciences, Engineering and Technology 2(2): Page 170-175, ISSN: 2040-7467.
- [7] M.Z. Rashad, M.S. Kandil, A.E. Hassan and M.A. Zaher (2010), “An Arabic Web-Based Exam Management System”, International Journal of Electrical & Computer Sciences IJECS- IJENS Vol: 10 No: 01. Page 48-55.
- [8] Naresh.Chiranji, CH.Deepthi, T.P.Shekhar,”A Novel Approach to Enhance Security for Online Exams”, IJCST Vol. 2, Issue 3, September 2011.
- [9] Y. Zhenming Y., Z. Liang and Z. Guohua (2003), “A Novel Web-Based Online Examination System for Computer Science Education”, 33rd ASEE/IEEE Frontiers in Education Conference, S3F-7-S3F-10.
- [10] Mohammad A Sarrayrih1, Mohammed Ilyas (2013), ”Challenges of Online Exam, Performances and Problems for Online University Examination”.

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